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The Lamp

December 1952

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The Lamp
December 1952

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A NOSTALGIC GALLERY of commercial art, most of which helped sell oil, lamps or stoves a half century or more ago, adorns our cover and pages 11 to 14. Here, in Victorian camouflage, are some hardy perennials of the advertising world: the wholesome family group, the actress' testimonial, the capsule drama of "before and after." For a number of these specimens we are indebted to the Bella C. Landauer Collection of the New York Historical Society. Other credits are below.

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STANDARD OIL COMPANY (*NEW JERSEY*)
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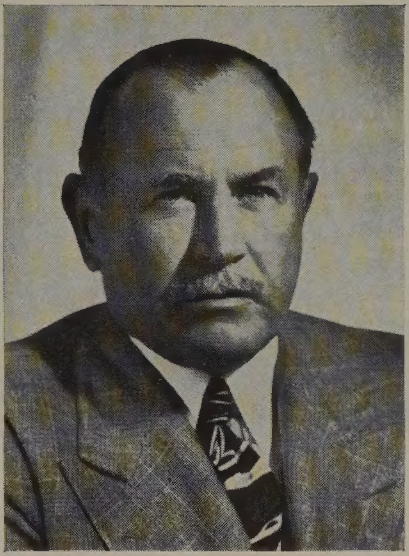
ON GUARD AT THE TRACKS, a railroad crossing watchman sits beside his shanty in Maspeth, Long Island. At train time he bars the road to motorists, using the "stop" standard by day, a red kerosene lantern after dark

F. H. BEDFORD JR.



FREDERICK HENRY BEDFORD JR., who died on December 2, at the age of sixty-one, had been a member of the board of directors of the Standard Oil Company (New Jersey) since 1927.

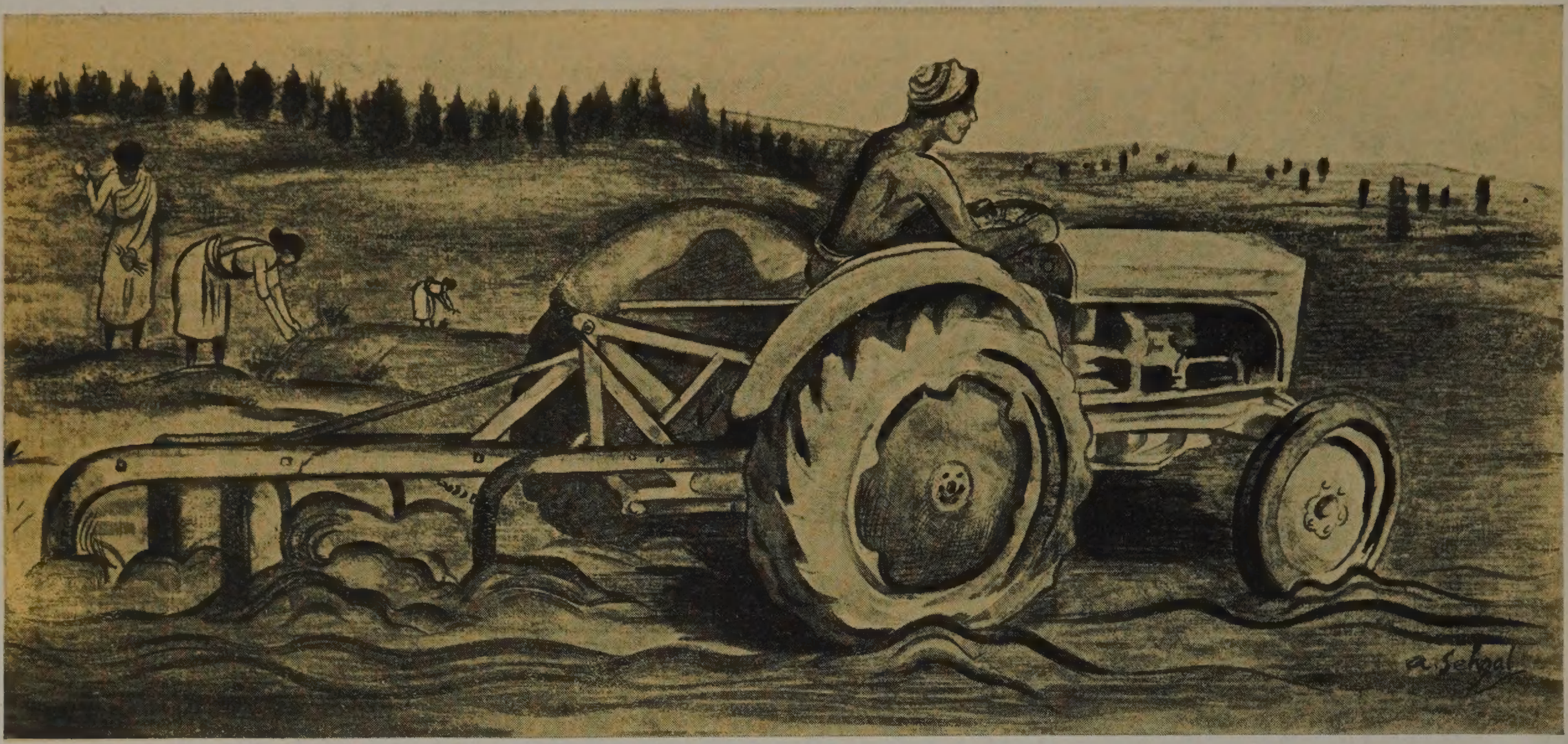
Mr. Bedford died in his sleep in Barranquilla, Colombia, while on a business trip. It was a trip similar to countless others he had made during his thirty-eight years with the Jersey company, for his was truly an international career. His love of travel was as much a part of his personality as his flair for the techniques of marketing and advertising, and both qualities contributed to the part he played in shaping the company to which he devoted his life.

Mr. Bedford, whose father was a member of the Jersey board of directors from 1911 to 1926, was familiar with every phase of the oil business, but it was to the field of marketing petroleum products that he brought singular energy and imagination. His ideas were a major influence in transforming the old-fashioned "filling station," which dispensed gasoline and little else, into the modern service station, with its many conveniences for motorists.

Mr. Bedford was also a guiding figure in the development and marketing of specialty petroleum products. As early as 1916, only two years after graduating from Amherst College, he organized a department of the Jersey company that became Stanco, Inc., an affiliate formed to produce specialty products from petroleum. After serving with the U. S. Army overseas in World War I, he was appointed manager of the lubrication department, a member of the marketing committee and manager of the specialties department.

Later, Mr. Bedford organized two more Jersey affiliates, the Standard Oil Company of Pennsylvania and the Atlas Supply Company, an organization to market tires, batteries and other automotive accessories. In the early 1930s, he coordinated advertising for all Jersey affiliates, and in 1948 he was elected to the board of directors of the Ethyl Corporation.

In recent years, Mr. Bedford gained prominence as a goodwill ambassador for American business. Several times, as president of Atlas, he and a group of other executives flew from country to country aboard the famous *Atlas Sky Merchant*. On one whirlwind flight, he covered twenty-six countries and four continents in 100 days, and still found time to visit General Douglas MacArthur in Japan, Prime Minister Jan Smuts in South Africa and Pope Pius XII in the Vatican.



Oil and India's

by J. P. Saigal

Indian economist, formerly on the editorial staff of the Eastern Economist of New Delhi, who has been studying in the United States

WHAT happens in India in the next few years is of crucial import to the entire world.

Here 361 million people, roughly one-sixth of the world's population, stand at the crossroads of their national destiny. Moreover, their vast land, strategically situated at the doorway to the East, has become a critical front in the contest between the world's cultures.

The outcome still lies in the shadow of unanswered questions. But it is already clear that it depends to a large degree on the progress the country is able to make in solving her internal problems.

The strides already taken since independence, in spite of the deep wounds of partition, give some grounds for hope. For the first time in modern history, the political integration of the princely states makes it possible to implement a uniform and effective national policy. India today has both a responsible leadership dedicated to democracy and an electorate whose political awareness is out of all proportion to the low rate of literacy.

But political emancipation has no more than cleared the stage for another struggle—the struggle against poverty. It is one of the ironies of history that this country, once one of the world's richest, should have become one of the world's poorest.

Under the pressure of rising population coupled with insufficient food supply, the Indian people over the years have fallen into a slough of want, bringing in its wake squalor, disease and starvation.

To remedy this situation has become India's most urgent problem. It has many facets, but in the main it is economic. Unless there is rapid, large-scale economic development, the hopes and aspirations which today flame in the Indian breast will remain unfulfilled, and democracy will become an empty catchword.

THE obstacles to such development remain formidable. Chief among them are the religious and social traditions that bind the people inexorably to ways of the past; the lack of facilities for communication; and the acute shortage of technical skills and available capital—both fundamental to building an industrial society in the modern world.

There are, however, items on the hopeful side, which are not to be discounted: rich natural resources, particularly coal, iron, manganese and mica deposits; an abundance of fertile land, much of which can be reclaimed by irrigation and much more which needs only clearing to become productive; and above all, an unquenchable spirit of determination on the part of both the people and their leaders, a spirit which has already found some expression in a carefully worked out program for India's economic development.

To modernize India's economy will require heavy investment, far beyond that which can be provided by mobilizing the country's internal resources or by aid from institutions such as the International Bank for Reconstruction and Development.

Particular significance attaches, therefore, to the agreement reached in 1951 between Standard-Vacuum Oil Company (a Jersey Standard affiliate) and the Indian government under which the former has agreed to build an oil refinery on an island in Bombay Harbor at a cost of $35 million. This represents the largest single investment of American private capital made so far in India. Similar agreements have been or are being concluded with other oil companies, both American and British.

The immediate, practical benefits of establishing a local refining industry, a new and major domestic enterprise, are obvious. As India embarks on her fight for economic rehabilitation it will give her better assurance of a continuing supply of oil products so essential to her welfare.

Experience of recent years has shown how important this is. Having no major refining industry of her own, India has been dependent on sources beyond her

MECHANIZED EQUIPMENT will be most useful in reclaiming India's cultivable waste land. Existing farms are too small to make it practicable except in community projects

BULLOCK CARTS, which creep at a snail's pace over the rutted roads, carry most of India's farm produce to market. As highways are improved, trucks will be used more extensively

Economic Future

borders for virtually all oil products. From time to time this flow has been disrupted—either by import restrictions caused by a shortage of foreign exchange or by dislocations of the source of supply, such as the shutdown of the Anglo-Iranian refinery at Abadan, Iran.

Once her domestic refining industry goes into operation, India will be able to transfer her outside dependence from products to crude oil only, except for certain highly specialized fuels. There are many world sources of crude, and its supply therefore is much less susceptible to disruption. Thus, one point of uneasiness for the future can be removed.

INDIA'S INLAND WATERWAYS consist of nearly 10,000 miles of rivers and canals. Transport on them is still old-fashioned but modern power craft are beginning to make their appearance

The establishment of the refinery will also bring a number of corollary benefits: a new field of employment and training for Indian citizens, particularly in a variety of jobs for skilled technicians; an increase in tanker traffic to the port of Bombay; a source of income to the government through additional taxes.

None of these factors can be said to make a major contribution to solving India's economic problems, although they should all prove helpful in a limited way.

The chief importance of the agreement, representing as it does a milestone in economic cooperation between East and West, is perhaps psychological.

IN 1948, at the time the negotiations were begun, such an achievement as is represented by the final outcome seemed highly improbable.

There was, among Indian leaders, a strong body of opinion which looked with disfavor on the admission of foreign capital, partly because of suspicion, partly because of the feeling—under the first flush of independence—that India should go it alone in financial affairs.

Western capital, in turn, was at that time skeptical of India as a promising climate for sound investment. With a relatively new government there was no clear pattern of past experience on which to chart probabilities for the future. In the background there was always the looming specter of possible nationalization and also considerable doubt concerning the freedom with which management would be left to operate the business and thereby assure an equitable return to the stockholders.

During the exchange of viewpoints which preceded the final agreement, the doubts and fears that beset both sides were gradually dissipated. It became apparent that Americans and Indians could sit down at the conference table and work out their points of difference in amity and understanding.

The working out of the agreement, then, became a kind of laboratory in human relations in which many hindrances to foreign investment were resolved.

THE terms of the agreement provide many long-sought assurances: that the refinery will be immune from nationalization for a period of at least twenty-five years; that there will be no import duty on crude and the company will never be required to sell products at a price lower than the import cost of refined products; that 75 per cent of the stock in common shares will be reserved for the company and the balance will be offered in cumulative preferred shares to Indian citizens.

IN PRODUCTION of jute bags and burlap India leads the world. A wide range of new industries is developing rapidly, including the manufacture of machine tools, rayon and chemicals

The company has also been granted exemptions from certain provisions of India's industrial laws.

The net result of these assurances will be to leave financial and managerial control in the hands of the company and thus allow full scope for the unhampered development of the enterprise.

Whenever India's oil product supplies have been interrupted the impact has been sharply felt, for there are few places in Indian life, whether in the daily routine of the home, in industry, in farming or on the road, where the products of oil are not a prime necessity.

More and more oil products will be needed as India makes progress on the economic front. Current requirements are in the neighborhood of four million tons annually, a figure which it is estimated will increase at the rate of about 4.5 per cent a year in the next five years.

Of all petroleum products, the most widely used in India is kerosene. It is a household necessity, used for many purposes, but especially for cooking and illumination.

Life in the villages would be unthinkable without it. As the sun goes down, kerosene comes into its own. A nightly chore for the housewife as dusk falls is to trim the wick, clean the chimney and fill the lantern.

Out on the streets a symbol of eventide is the lamplighter moving from post to post, scrambling up and down to check the lamps to make sure each has its quota of kerosene to last the night.

By the time darkness comes, light is gleaming from myriad lamps of many kinds, from the elaborate chandeliers of the rich to the handmade tin-pot of the poor.

Of the manifold roles which oil has to play in the richly varied life of India, perhaps the most vital is its potential usefulness in increasing the food supply and thus aiding in the fight against famine. This role is twofold: first, through directly increasing the supply of food by providing fuel for agricultural machines; second, by moving food more expeditiously to market.

Mechanization can be most effective in bringing additional acreage into the production of food. India has millions of acres of irrigable land, needing only a program of development to bring them into production. This program would require, among other things, oil-powered ditch-digging machines and stationary engines to drive the pumps.

Even more important are the vast areas of fallow land, many of them still choked with jungle, which have never been brought under cultivation. There are estimated to be some 69 million acres of cultivable waste land. The program for their reclamation is already under way with financial support from the International Bank to the amount of $10 million, much of it allocated for the purchase of bulldozers, tractors and other mechanized land-clearing and farming equipment.

Within the next five years it is estimated that reclamation and improvement of a portion of these lands will yield 1.5 million tons of additional crops. Successful reclamation of a sizeable proportion of this land, plus an increase in irrigation could, in themselves, make up the current deficit in India's food supply which now requires that the country import some two million tons of food crops yearly to feed her population.

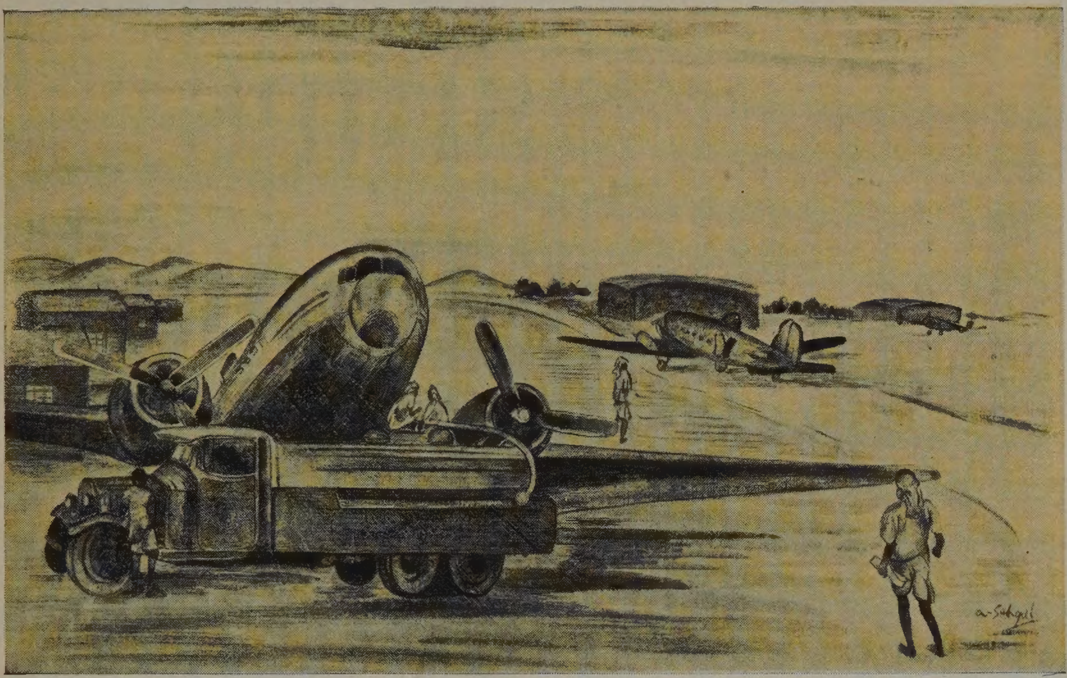
Less promising, although with the prospect of some progress on a limited scale, is the outlook for mechanizing India's existing farms. Most land holdings are too small, due to the age-old custom of dividing up the land of the father among his sons upon his death, to make mechanized farming practicable on any wide scale. Manpower is plentiful, and the purchasing power of the farmer low, causing further reluctance to turn to machines.

But the need for increasing mechanization wherever possible has now been recognized. Community development projects, launched partly with American aid, are making a full-scale attack on the farming problem. Emphasis is chiefly on improvement of seeds, fertilizers and general efficiency of farming methods. But the approach is on a community front and it is hoped that in time the spread of local cooperative effort may increase the scope for farm machinery.

SECOND only to the production of food in importance is the matter of transporting it. Here, too, oil can make its contribution as the truck replaces the bullock cart.

There are in India many areas, potentially productive, which now limit their output to local needs, since there is no means of getting the excess to market, due to the inadequacy of highway transport.

India's highway system in recent years had been allowed to fall into a pitiable state. There had been little new construction. The government, which controlled the railways, regarded all but tributary highways as possible competition. Now



NEARLY PERFECT flying weather eight or nine months of the year has stimulated the progress of civil aviation. Most of the important cities of India have already been connected by air

this policy has been reversed and road-building is an important feature of the government plan.

Existing highways have been further ground into disrepair by the prevailing mode of transport, the high, two-wheeled bullock cart which wears deep ruts into the roads. As ox-carts give way to trucks this hazard will tend to disappear.

So heavy are the arrears of past neglect that India will probably have to wait a very long time for a highway network to keep pace with her growing needs. One redeeming feature of a situation that might otherwise seem rather hopeless is the abundance of manpower in the villages only awaiting efficient mobilization for both construction and maintenance.

HOWEVER, there are brighter aspects to India's transport problem. One is the advantageous system of rivers and canals. Here transport is still old-fashioned, but Diesel-propelled barges are now beginning to make their appearance.

Another is aviation. For eight or nine months out of the year India has as fine flying weather as any country in the world, with scarcely a cloud in the sky. Indians have proved they make excellent pilots. What is needed now is more modern equipment. Already the progress of civil aviation has surpassed the most optimistic forecasts and there is hope that future progress will be even more rapid.

Although India's critical situation mainly revolves around the improvement of agriculture and transport, industrial developing too is of profound importance in attaining the kind of balanced economy requisite for stability in the modern world.

In this sphere India today has a far more dynamic policy than is perhaps generally realized by the western world. Assembly plants have already gone up, not only to make agricultural machinery from imported parts, but to turn out stationary engines and vehicles of all kinds, pleasure cars as well as trucks.

A wide range of new industries of a kind usually associated with countries which are more advanced technologically is coming into being: the manufacture of rayon, machine tools, metal alloys, and above all, huge new chemical industries. Meanwhile, her traditional industries—the manufacture of jute bags and burlap, in the production of which India leads the world; the highly favored Indian tea; iron and steel, cement and cotton — all these are forging ahead rapidly.

Indian industry looks to oil products not only for fuel, but also for a wide range of specialty products, cutting oils and batching oils as well as lubricants.

Since the early days of its marketing operations, Standard-Vacuum has maintained a reservoir of technical advice, consultation and assistance to Indian industry in the use of oil products.

Field salesmen have made a point of assisting on plant problems as they arose and referring all problems which they could not handle to a staff of technical men at the central offices.

This consultation service will become all the more valuable to Indian industrialists as they venture into new fields.

Standard-Vacuum has been making intensive efforts at exploration in India in the hope of increasing local crude oil supplies. At present, production is limited to the output of the small Digboi field in northern India and accounts for only 6 per cent of the country's consumption.

Preliminary findings of an airborne magnetometer survey recently conducted in the Bengal Basin—the first, incidentally, ever to be undertaken in the Far East—are promising, and the company hopes to have the opportunity to carry the search further. Whether oil actually will be found will, of course, be shown only by drilling, which in turn will depend on the outcome of the current surveys.

It is expected that the new Bombay refinery will be operating by 1955. Plans have been approved, the technical staff has been assembled and construction is about to start.

As the agreement is implemented, it becomes a tangible demonstration of faith in the possibilities of economic cooperation between the Indian people and American private capital toward the solution of one of the most critical problems facing mankind today.

RURAL HOMES in India are lighted by kerosene, the country's most widely used petroleum product: 87 per cent of the people live in communities where electrical power is not available

SHIPS IN A HURRY

Every hour counts when a giant passenger liner comes into port

IF you watch them putting the pilot aboard an incoming ocean liner off Ambrose lightship at the entrance to New York harbor, you will see the red and white flag which stands for “H” in the international code—the pilot flag—rise smartly to the vessel’s yardarm. And if you run your eye over the other signal flags that the vessel flies, you will begin to get an idea of all that happens to a great ocean liner during the day or two which it spends in port between its voyages.

In the spatter of color on its halyards, the blue flag with “USM” in white on it is the mail flag. The blue and white “M” and “J” of the international code are a request for customs and immigration officers. The yellow international “Q” indicates that the vessel is awaiting completion of her medical inspection.

But nowadays not all incoming vessels fly the yellow “Q.” The biggest passenger liners get permission to dock by radio and consequently pass the quarantine station in the Narrows without stopping.

This applies to such ships as the great British liners *Queen Elizabeth* and *Queen Mary*, largest vessels in the world, the French *Liberté* and *Ile de France*, and the fast new American liner *United States.* (The new liner broke all North Atlantic speed records on her maiden voyage.)

Docking these giants at their piers in the North River is as nice a piece of craftsmanship as you could wish to see. The *United States* draws about 30 feet of water and docks regardless of the tide. Thereafter she has 76 hours in which to bunker from Esso barges and replenish her stores, in addition to paying off and signing on all her 1,000 officers and crew below the Captain himself. Because New York is her home port, she spends more time there than her companions in the North Atlantic service.

The *Liberté* and *Ile de France* draw a maximum of 35 feet of water, and they too dock regardless of the tide. The *Liberté* takes from 24 to 28 hours for her turnaround, the *Ile de France* from 36 to 40.

The two *Queens*, because of their enormous size, draw about 38 feet of water and are limited in docking to the half-hour on either side of slack water when there is little or no tidal movement in the river. Their turnarounds vary from 21 to about 40 hours.

Like the *United States*, the two French ships and the *Queens* are bunkered by Esso; and in view of their short turnarounds, bunkering goes on all night.

The actual docking of all these big vessels is accomplished with the aid of the docking master who takes over from the Sandy Hook pilot just before the liner comes abreast of her pier. It is the docking master who helps the Captain bring the towering liner into her slip and alongside her pier as handily as if she were a canoe; and it is he, when the vessel is secure, who sounds the cheerful wolf call on his mouth whistle which means “Finished with tugs.”

Then first class, cabin and tourist, they begin streaming down the gangways to the upper deck of the pier—the passengers who are home from Chartres, Aix-les-Bains, the Lido, Piccadilly Circus and the Place de l’Opera, and likewise the passengers who live in those exciting places and are far from home. Their baggage begins clicking down the belt conveyors to the pier where the porters sort it out under its owners’ initials to await examination by 150 to 300 customs inspectors.

MEANWHILE, preparations for departure begin as soon as the liner docks. Two oil ports low down in her off-pier side are soon opened and the big Esso oil barges on the far side of the slip are brought alongside. While an Esso man is discussing the details of the bunkering with the liner’s chief engineer, the oil and steam lines are being coupled up and the liner’s engineers are gauging the heated oil in the barges’ tanks. As soon as the gauging is finished, the black 6-inch oil lines stiffen up under the throb of the pumps.

Thereafter, pumping continues for 20 to 24 hours, stopping only long enough to remove an empty barge and bring another full one alongside. During all this time, thousands of tons of bunker fuel oil, heated by steam coils in the barges to make it pump easily, flow into the liner’s enormous tanks. It is this heavy black oil, burned in the booming dazzle beneath the boilers, which produces the steam that drives the liner across the North Atlantic. It also heats and lights the ship, runs the blowers, elevators, telephones and radio, provides refrigeration for the butcher’s storerooms, hot water for the bathrooms, and steam for steam tables in the galleys.

Esso’s record for bunkering the huge *Queens* was made when the *Queen Mary* arrived on December 22, 1951, two days late as a result of heavy weather at sea. Three Esso barges pumped 42,279 barrels into the *Queen Mary’s* tanks in 15 hours 55 minutes, or an average of 2,845 barrels an hour. Esso’s largest single delivery to any vessel in regular passenger service was one of 54,933 barrels to the Cunarder *Berengaria* on October 12, 1936.

Other preparations for departure begin as promptly as bunkering does. As soon as one of the *Queens* or the French ships docks, thousands of tons of fresh water begin flowing into her tanks from the half-dozen city hydrants along the pier. It takes from 16 to 18 hours’ flow to slake the giant’s thirst. The *United States* does not rely on city water but evaporates all her water requirements from sea water.

In little more than an hour after docking, from 2,000 to 5,000 bags of mail are discharged into the trucks that deliver them to the post office; and the first chute is then free for loading stores. From that point on, 50 or 60 truckloads of stores roll into the pier in accordance with a timetable that rarely varies. Hothouse grapes, frozen strawberries, pails of scallops, sides of beef, all are inspected on the pier by the Department of Agriculture, the company’s catering superintendent, the chief steward and the chef. Stores that are accepted go onto the chutes and belt conveyors that carry them in a steady stream into the lower decks of the ship.

Meanwhile, the last inbound passenger disembarked about three hours after the vessel docked and the stewards began their housecleaning of all the passenger spaces in the upper and middle decks of the ship. As a result, when the Captain makes his inspection, the passenger spaces are a glow of snowy decks, polished brasswork, clean linen and vacuum cleaned carpets.

PASSENGER embarkation begins some three hours before sailing time. A half-hour before sailing time, the 16 gangways and baggage conveyors are one by one lifted clear of the ship until a single first-class gangway is all that remains. Simultaneously, they begin taking in the 9-inch hawsers until only three lines remain forward and aft. Then the last gangway is lifted clear, and what happens after that is governed by the red traffic signal out at the end of the pier.

As soon as the river is clear, the red changes to green or white. The order to “Let go everything” follows, and the sleeping vessel wakes when “Slow astern” is rung down to the engine room. With the water boiling up from her big propellers, the ship backs slowly out of the slip under her own power. When her towering stem has cleared the pierhead, the docking master uses his tugs to straighten out the huge liner in mid-river, with her nose pointed downstream. Then he goes down the Jacob’s ladder, and the Sandy Hook pilot takes the vessel down the river.

Two hours’ slow progress brings the liner down the Upper Bay, through the Narrows and out to Ambrose lightship where the air is fresh and salty and the great vessel begins to feel the long ocean swell. There the pilot vessel takes off the Sandy Hook pilot, and the outbound liner goes up to cruising speed and soon disappears beyond the horizon where there is all the sea-room in the world and the only fixed bodies are such infinitely remote points as the sun and the stars.

AN ESSO BARGE begins pumping bunker fuel oil into the new SS *United States* as soon as she ties up at her North River pier

Carolina Melody Man

Jerry Ball, an Esso employee, is a living legend in his home town

PEOPLE on their way to work in downtown Charlotte, North Carolina, that January morning, smiled when they heard the strains of *Who Put the Overalls in Mrs. Murphy's Chowder?* tinkling merrily through the frosty air. When they saw where the music was coming from, they gasped.

High above traffic, smack in the middle of Independence Square, was their old friend Jerry Ball, playing his piano on a platform suspended from a crane by a thin steel cable. The platform pitched and rocked in the gusty winter wind.

"That Jerry Ball—he'll do anything for a buck," snorted a red-faced state trooper, and then he slipped a dollar bill into the tiny replica of an iron lung attached to the microphone on the corner. "Play," he rasped into the microphone, "*My Mother Says Stars Are the Windows of Heaven, Where Angels Peep Through.*"

Soon, on the four corners of the Square, people began to cluster around the microphones, put money into the boxes, and ask for tunes. Blithely, the pianist created a gay, flowing medley out of them, never missing a beat as the platform swayed back and forth ninety feet in the air.

It was another of Jerry Ball's fantastic concerts, one of many that are making him a living legend in North Carolina. In recent years, Jerry has played his piano to buy milk for children, a fire engine for a town, an organ for a church and, through organized charities, to help countless sick, impoverished and crippled people.

Piano playing and fund raising, however, are avocations with Jerry Ball. Since 1930, he has been an employee of the Esso Standard Oil Company's North Carolina sales division in Charlotte. Those who have worked with him will tell you, in fact, that Jerry's musical talent is only one facet of the personality of a man singularly absorbed in his community, its projects and its people.

They'll tell you that he goes to prison cell, hospital ward and street corner offering whatever help he can give to those in need. They'll mention his work with the mayor's commission on alcoholism and the part he plays in helping prisoners in local jails make a new start. From the energy he spent getting people to vote in the last election, they say you would have thought he was running for president himself.

JERRY is a tall, mild-mannered man with pale dreamer's eyes and a voice that blends a midwestern twang with a soft southern accent. When you ask him how things are going, he invariably replies, "Why, charmin'. Just charmin'." Recently, after scrawling a series of notes to himself on a memo pad, he leaned back and talked about how he happened to be doing so many extracurricular things.

"It really started with my job here at Esso," he said, cupping his hands behind his head and staring briefly at the ceiling.

"Part of my job is to show Esso films—you know, the movies about states. Some evenings I show them at hospitals, the mental home and places like that, where the patients don't have much chance to see movies. One night about four years ago I went to the poor home. After the movies were over, it was still early. I saw a piano in the corner, so I decided to give a little concert. I used to be a kind of professional pianist, but I hadn't played much since I started to work for Esso. I played *Paper Doll* and *Indian Love Call* and *Ah! Sweet Mystery of Life*. It took maybe half an hour.

"When I was packing up to go home, this little old lady touched me on the shoulder. There was a quavery sort of smile on her face. She said, 'Mr. Ball, we all enjoyed your playing very much.' Then, she reached out her hand, and there was a twenty-five cent piece in it."

Not long after, Jerry happened to read something in a book that seemed to translate the vague feelings, which this incident had left with him, into words that spoke directly to him. He copied the paragraph and slipped it under the glass on top of his desk. It is there today.

KIDS at the orphanage have as much fun as Jerry when he acts out *The Three Little Fishies*

"Becoming humane," it says, "means a long period of self-discipline—moving from the immaturity of self-centeredness to the maturity of being 'other-centered.' The immature person says, 'What does this have to do with *me?* What do I get out of it?' The mature person says, 'What does this have to do with *us?* What do we put into it?' "

But bringing this idea down to the realities of everyday life wasn't easy. In fact, his first impulsive attempt was almost enough to dishearten him.

On a hot August afternoon, Jerry saw a boy sitting on a curbstone despondently staring at his toes. Glowing with good will, Jerry walked up to him.

"Sonny, here's a dollar. Run over to the store and get yourself the biggest watermelon you can see!"

The boy's eyes widened. "Gee, thanks," he mumbled, and in a flash the door of the store slammed behind him.

Jerry waited. In a moment the boy darted out of the store and skittered around a corner. He was clutching a package of cigarettes in one hand and a jackknife in the other.

Jerry was chastened, but not discouraged. Still searching for a way to be of help, he began to ride in the police prowl cars after work. Occasionally he was able to lend someone a hand, but he still didn't feel that he was accomplishing anything worthwhile. "Doing good" wasn't as easy as it seemed.

Then, one day Jerry read in a newspaper that the March of Dimes was at a standstill. Suddenly his nebulous feelings of good will had a focus. This was the chance he'd been looking for.

He put on his first fund-raising concert in a store window in the center of town. Red-lettered signs announced that anyone contributing a dollar could request a tune. If Jerry didn't know it, he'd contribute another dollar of his own money. He guaranteed to play non-stop from dawn to dusk. If, for any reason, he had to quit, he'd donate $500 to the campaign fund.

Jerry taped his fingertips with adhesive to keep them from cracking, sat down at the piano, and went to it. Crowds jostled in the streets outside the window. Requests poured in, and Jerry dipped into a bottomless musical memory and played them all—or nearly all—by ear.

He was an appealing sight—a wistful Pied Piper, with his wide-brimmed hat perched on the back of his head, showing a shiny bald curve, and his long arms flapping like ducks' wings as his hands danced over the keys.

Whenever it looked as though contributions were slowing down, Jerry did tricks. He covered the keyboard with a bedsheet and made a valiant attempt to follow *The Flight of the Bumble Bee.* He played backhanded, crosshanded, lying down, and backwards. All in all, for ten solid hours, he put on quite a show.

Jerry was an immediate hit. Soon after the concert, the March of Dimes achieved its quota, and the director wrote that the magical upswing in contributions was due entirely to Jerry Ball.

SINCE that time, Jerry has staged his Pianothon, as the newspapers call it, for dozens of community causes, often under conditions that would send a less dedicated musician into mute frenzy. He has played on the back of trucks, in tents, smoky halls, draughty auditoriums, and in the open air. But Jerry is unperturbed by weather or acoustics, for he realizes that the real beauty of his music comes from the counterpoint of clinking coins and ruffling bills—the money donated to help people who, because of circumstances, cannot help themselves.

Jerry obviously enjoys playing under any conditions. One reason is that his concerts take him back to the footloose days of his youth when he was a piano hobo, knocking around the Mexican border with a four-piece band.

Just as in today's benefits, Jerry and his band played solely for the contributions of the audience. Usually they had to blow the roof off just to make enough money to get them to the next town. But Jerry tired of being a honky tonk minstrel, and so he took a job with an orchestra going east. Shortly after he arrived in Charlotte, he joined Esso as a clerk-stenographer.

Though Jerry has a flair for showmanship, which is apparent when he sits at a piano, many of the things he has been doing in recent years are the quiet, selfless acts of a man who is trying to understand and help people in a direct and personal way.

Among his best friends are the patients in hospitals where he goes to play a few songs and to chat with anyone who feels like it. People whom Jerry has met in this way are often deeply grateful for some incredibly small favor, such as a passing word of encouragement or the gift of a cigarette, during a lonely time in their lives.

Of all his friends, Judge Willard Gatling, who presides over the court of domestic relations, is the one from whom Jerry has probably learned the most about people and their problems. Jerry often sits in at the Judge's court, and then the two friends go out to lunch—ham and cheese sandwiches in Leo's delicatessen—where they discuss the cases that have come before the court that morning. Jerry feels that the Judge is occasionally depressed by the parade of grief he must pass judgment upon every day. To help cheer him up, Jerry once had a fake newspaper printed, which carried the headline JUDGE GATLING RESIGNS: BECOMES MANAGER OF DODGERS. The Judge, well known as a baseball fan, was delighted with the news. To make sure that all his friends would see it, he issued a formal denial to the newspapers in Charlotte, and thus the story was spread all over town.

Another sudden whimsey of Jerry's delighted a ward full of sick children not long ago—and gave three Esso representatives from New York a chance to discover buried talent in themselves. The visitors wanted to hear Jerry play, and so he invited them to a concert at the children's hospital.

Kids were lined up on the beds and on both ends of the ward. Jerry sat down at the piano, played a dramatic flourish, and immediately made an announcement.

STUNTS like this are always good for a laugh, and sometimes a few extra donations

"Kids, we have a very special treat this afternoon. Three world-famous singers are here from New York—the incomparable Esso Trio!—to sing *Down By the Old Mill Stream.*"

For a tortured moment, the three New Yorkers grinned sheepishly at one another and then, bracing themselves, burst into song. The kids loved it. Asked later about the performance, Jerry replied innocently, "Why, it was beautiful."

As you might expect, when Jerry wants to cheer himself up, after his job with Esso, his civic work and his concerts, he goes home and lazily teases melodies out of his piano. Usually, his wife Inez and their two daughters, Berna Carolyn, aged seventeen, and Celeste, aged six, like to hear him play, but a charivari of protest rings through the house when he drifts into *The Banquet In Misery Hall*, a wailing dirge Jerry learned from a nineteenth century recording. It is one of his favorite tunes, not because of its melody but simply because of its title.

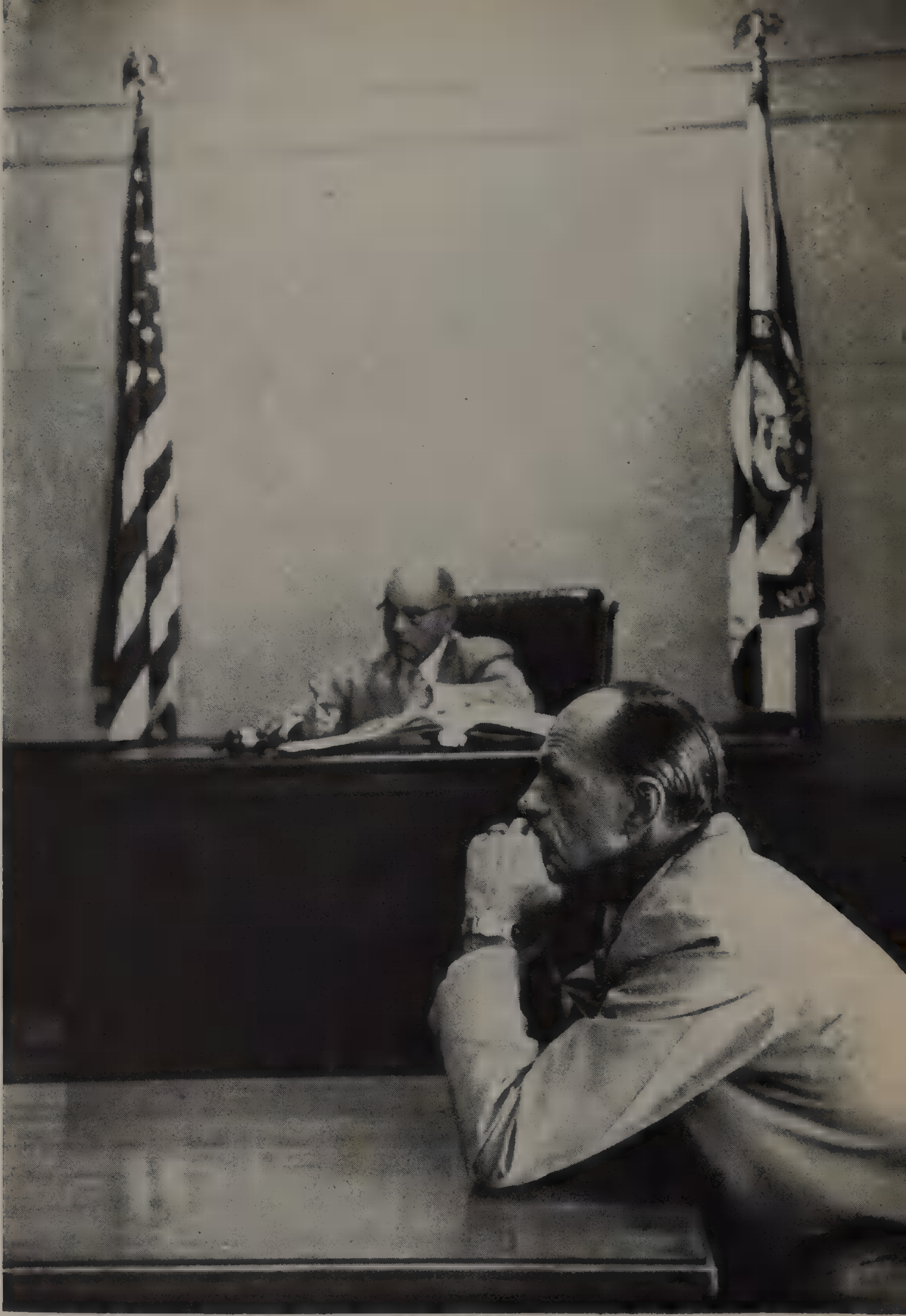
Inez, by the way, spends almost as much time as Jerry in work with people—mostly in church and hospital groups. Consequently, she understands when Jerry is kept late playing a concert or attending a meeting.

JERRY'S extracurricular activities also merge smoothly with his job. He is public relations representative of Esso's North Carolina sales division, a position that brings him into daily contact with people and with many phases of community life. It involves, among other things, local advertising and publicity, and editing The Tarheel News, a bi-monthly magazine for employees and annuitants in North Carolina.

Of course, Jerry's concerts and civic work are the best kind of public relations, because his easy and friendly personality represents the company wherever he goes. Indeed, it would be difficult to say where Jerry's spare time activities begin and his job leaves off. After one of his major performances, for instance, Esso dealers around Charlotte reported that customers were driving into their stations and saying, "Give me some of that Jerry Ball gasoline!"

Today, Jerry goes about his work, inside or outside the office, with the zest of a happy man. As he himself says, he has the peace that comes from the feeling that he is doing the best he can with his life. This feeling is strengthened by the letters he receives from people whom he has helped. One letter, which he has saved carefully, was from a girl in a polio hospital.

"What a wonderful world this would be," the girl wrote, "if it were filled with people who not only give their money but themselves, as you do."



INTENTLY, Jerry listens to the testimony of a man on trial in criminal court. Below, he visits his old friend Judge Gatling (center) and hears a discussion of domestic relations

OIL IN THE EARLY YEARS

IN the latter decades of the last century, the soft yellow glow of kerosene lamps from the windows of America gave nightly testimony to the universal demand for illuminating oil refined from petroleum. Not only kerosene but also paraffin wax and mineral oils and greases had replaced whale oil and tallow for industrial and household uses, ranging from axle grease to medical nostrums.

These reproductions, of early advertising art and other pictures, re-create a bit of the lamplit atmosphere of that era. Gaslight was a rare and rather terrifying innovation; the trick of making an electric filament burn continuously in a vacuum was still a laboratory phenomenon; and, for a while, kerosene was king.

A FAMILY CIRCLE typified the ultimate in domestic content, thanks to the kerosene lamp overhead. By the light of its mellow rays, the boy reads aloud to three delighted generations

PETROLINA, made, its manufacturer advertised, "from the heart of Petroleum," came in eight varieties for uses which included treating the bronchial tubes and dressing the hair

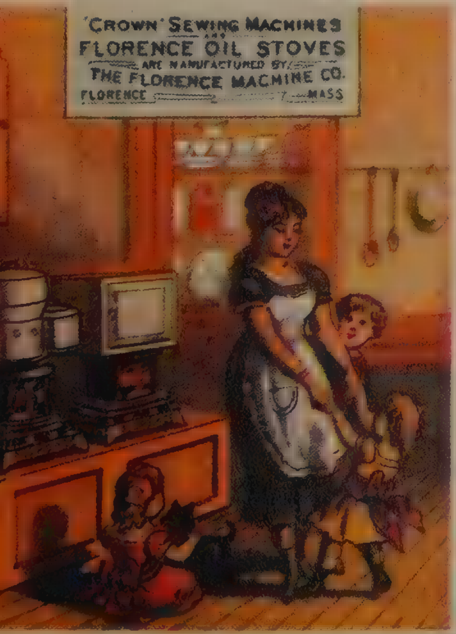
A KITCHEN MARVEL in 1883 was the Golden Star multi-burner oil range, "for all kinds of cooking, broiling, baking, washing and ironing." The price, $20. The tin oven cost $4 additional

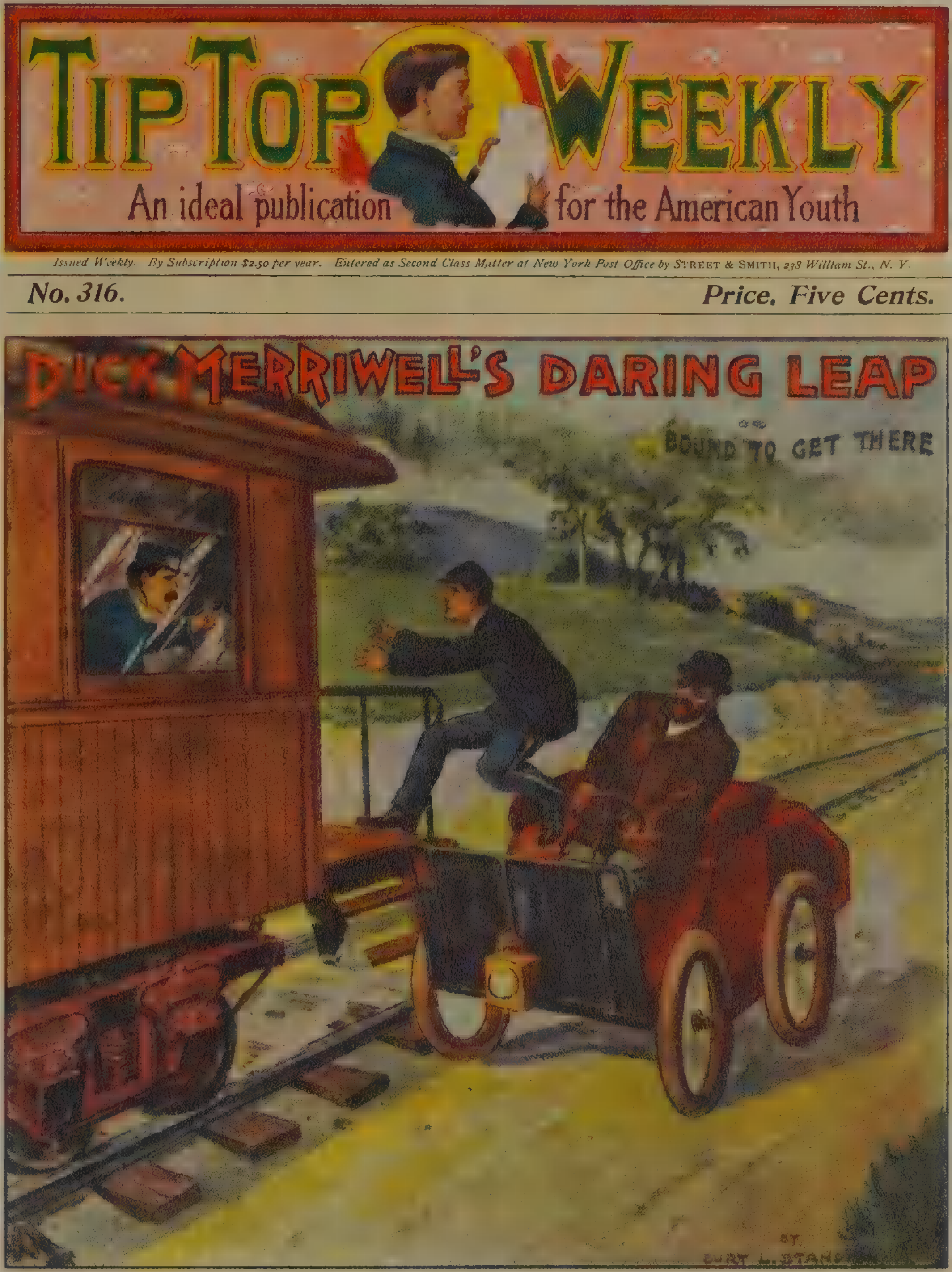
COOKING OIL one batch at a time the refiner used a lot of hand labor. Cylinder oil was a heavy lubricant for machinery like steam engines

VASELINE
Chesebrough Manf'g Co.
NO. 110 FRONT ST. NEW YORK.
NO. 41 HOLBORN VIADUCT LONDON, E.C.
NO. 246 NOTRE DAME ST. MONTREAL.

VASELINE (from German *wasser*, water, and Greek *elaion*, oil) was popularized by Robert Chesebrough's world-wide advertising. At first, people feared a "petroleum jelly" might explode

BEFORE AND AFTER: Life became beautiful for this housewife when she changed her coal range for an oilstove, probably in the 1880s



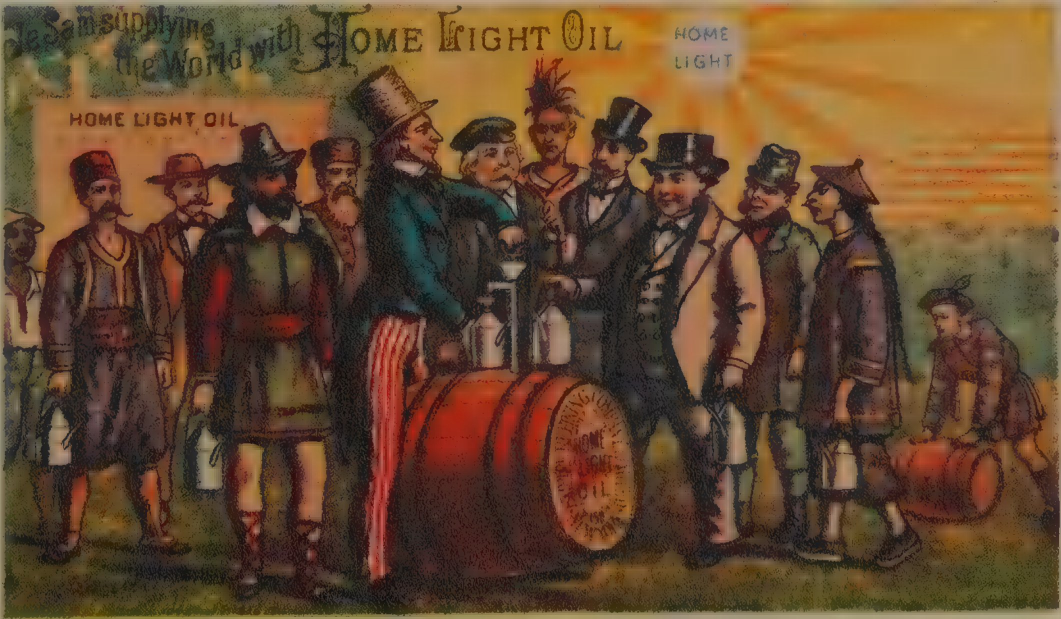

TIP TOP WEEKLY
An ideal publication for the American Youth

Issued Weekly. By Subscription $2.50 per year. Entered as Second Class Matter at New York Post Office by STREET & SMITH, *238 William St., N. Y.*

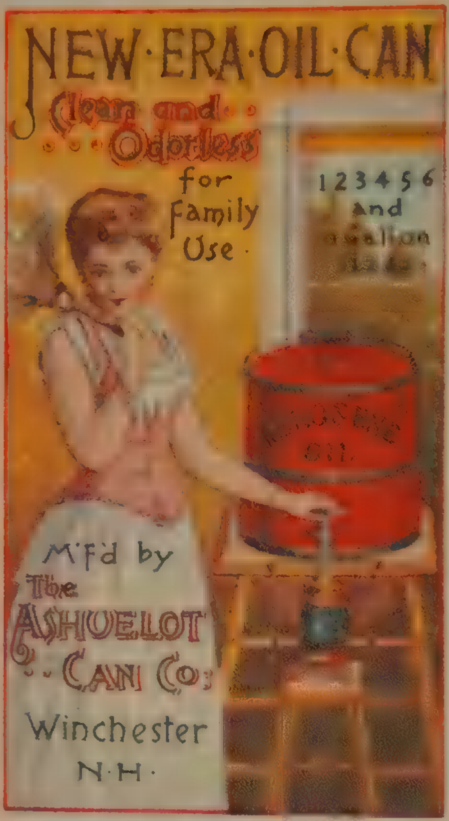
No. 316. *Price. Five Cents.*

DICK MERRIWELL'S DARING LEAP
OR
BOUND TO GET THERE

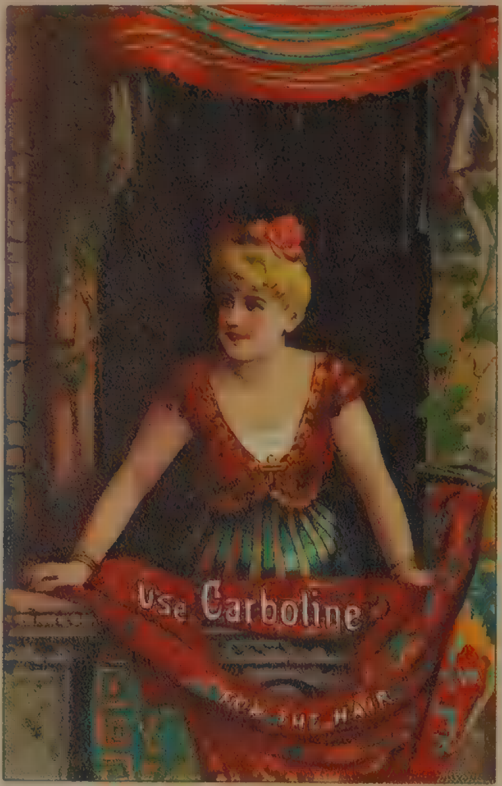
AN EARLY AUTOMOBILE, with oil-burning head lamp, appears in this 1902 adventure. Dick Merriwell's doings at Fardale School began when his brother Frank departed to enter Yale


le Sam supplying the World with Home Light Oil
HOME LIGHT
HOME LIGHT OIL
HOME LIGHT OIL

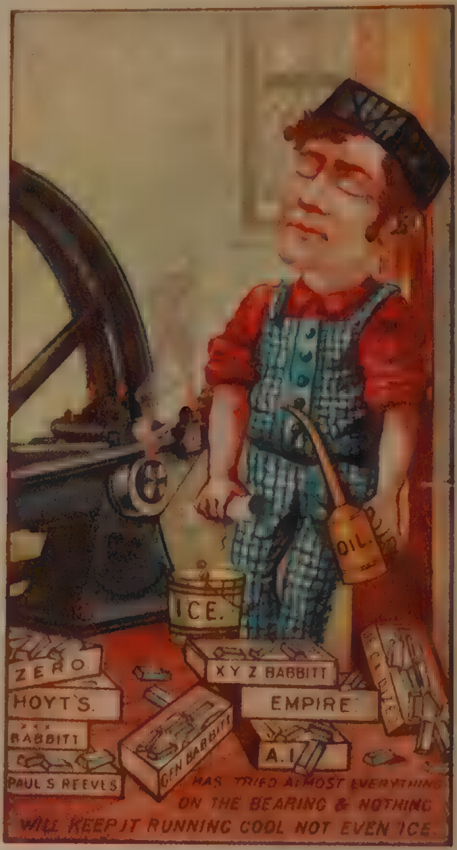
NATIONS OF THE WORLD were portrayed in the 1880s thronging to buy U. S. kerosene. The Empire Refining Company made Home Light Oil at a plant on Newtown Creek, Long Island



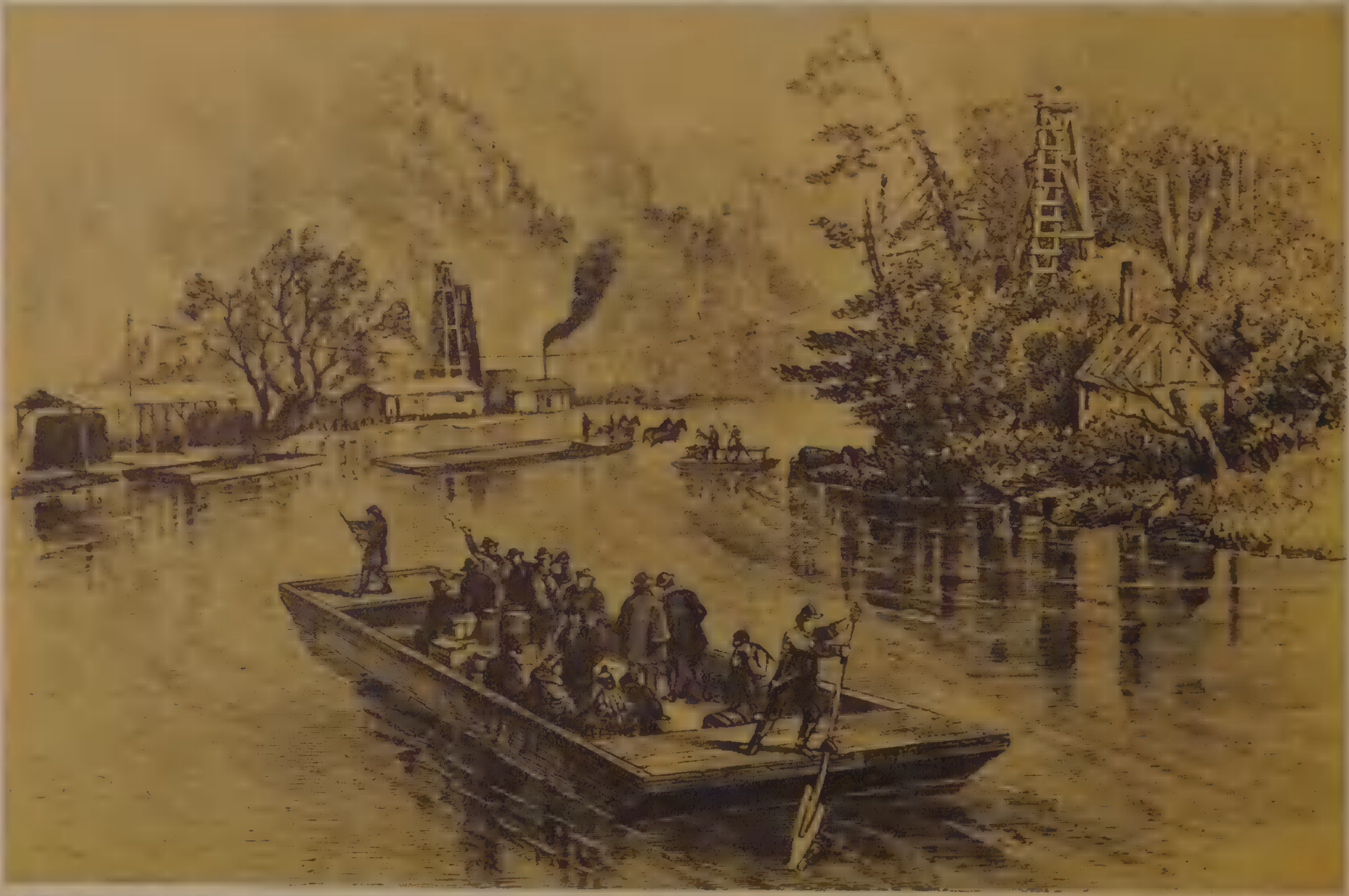
A FANCY CAN of 188[illegible]ed New Patent Elastic Coating, New Patent Faucet Guard, Patent Oval Head Braced Faucet, and Patent Improved Filler and Trim



ACTRESS Lillian Russell's portrait decorated this 1886 ad for a $1 a bottle product with "elements required by the hair to feed upon." Presumably Miss Russell was a satisfied user


OIL.
ICE.
ZERO
HOYT'S.
BABBITT
PAUL S REEVES
G'N BABBITT
XYZ BABBITT
EMPIRE
A.I
HAS TRIED ALMOST EVERYTHING ON THE BEARING & NOTHING WILL KEEP IT RUNNING COOL NOT EVEN ICE.

A HOT BEARING produced this lubrication crisis. The moral of the story no longer accompanies the picture, but probably the oil in the can bore the wrong brand



DOWN OIL CREEK sweepmen steer Pomroy's Express, a passenger packet of 1864, five years after the first oil well in northwestern Pennsylvania. At one time more than a thousand flatboats and steamers plied the creek and the Allegheny River, carrying chiefly oil in barrels

WARMTH cast by spinning jets of burning natural gas protects crops from damage by frost

WHIRLING FLAME

THE eight states that stretch across the southern border of the United States, from Atlantic to Pacific, depend for much of their income on farm produce grown during their normally warm winters, while the rest of the nation is shivering. But an occasional winter storm, howling down from the north, overnight can destroy vegetable crops nurtured all season or fruit groves pampered for years.

Consider, as an example, irrigated Hidalgo County on the Rio Grande. Hidalgo is Texas' leading county in value of crops and in quantity of citrus. Its temperature average for January is a mild 60 degrees. But such an average includes brief cold snaps that can freeze out years of work and investment. An exceptional cold spell in the winter of 1950–51 wiped out seven million citrus trees (worth $160 million to $250 million) and almost all vegetable crops in Hidalgo and two adjacent counties.

The desolation which followed that winter's freeze gave an idea to Leonard A. Salmon, a construction foreman of Hidalgo County who knew little about farming except that frigid weather was bad for it. Salmon devised an outdoor heating device which he called the Whirling Flame.

The Whirling Flame consists of two arms, forty-six feet across, atop a sturdy ten-foot-high pipe. At the end of each arm are three jets burning natural gas fed by underground pipes. The jets cause the arms on which they are mounted to rotate slowly. Each Whirling Flame casts a benign warmth over an acre and a half.

Salmon installed nine Whirling Flames experimentally last winter on twelve acres of cucumbers and squash half a mile from the Rio Grande. Winter's first frost—only 30 degrees—killed most of the squash in Hidalgo County. But the acres shielded by gas jets remained comfortably safe with temperatures of 40 to 90 degrees. An acre of squash may be worth $500 to $1,000 to the grower in the winter, when prices soar in northern markets. Thus one saved crop may pay for installation of an artificial warmer, provided there is a supply of natural gas at hand.

THE GIRL ON THE BUS

An Italian bus hostess knows languages, legends and history

At eight o'clock in the morning the streets and squares of Rome were just beginning to stir with daily life. As the long light blue motorcoach turned into the Via Veneto, the uniformed girl adjusted the cap on her dark hair and straightened her blue jacket. Then she picked up the microphone and holding it close to her lips she said: "I am the hostess, Giuliana Campioni, and I shall have the pleasure of accompanying you to Florence. I am here to answer any questions you may like to ask. There is a bar on the coach. A happy trip to you, ladies and gentlemen!"

After making this announcement in Italian she repeated it in French and in English. When she had finished, a German passenger asked "Bitte?" and she said it over again in German. Then she sat down, with her back to the driver, so that she faced the thirty passengers, most of whom were tourists, on their first visit to Italy.

They were leaving Rome behind them now, having crossed the new bridge with its wedding cake trimmings, and the houses were giving place to green hills dotted here and there with pine trees. Giuliana, without seeming to do so, took a good look at each of the passengers. She had learned during her training course how to detect the signs of approaching car sickness, and having made

ON THE MAP, Giuliana points out a passing town. She is prepared to converse fluently with tourists in English, French, Italian or German

THE DRIVER ties a passenger's bicycle firmly to the top of the bus as tourists stare curiously out of the window at the sights in

RENAISSANCE wall sculpture comes into view as the bus heads down a Roman street, bound for the open country and the city of Florence

Esedra Square in Rome, starting point of the tour. In the center of the square, the hostess tells them, is the Fountain of the Naiads

PICTURESQUE HILLSIDE TOWN (below) looms ahead as the bus rolls through the country. Dark trees at the bend of the road are cypresses

GIULIANA breakfasts hurriedly at a counter before setting out on the morning trip from Rome. She must be aboard the bus early to check in her passengers

SEMINARY STUDENTS walk silently down a street in Assisi on their way to classes. St. Francis died in this little town in 1226

IN FLORENCE the bus draws up behind a preoccupied horse. This city is a favorite among travelers and a number of the CIAT tours converge here

this study almost every day for nearly a year now, she was sufficiently versed to see that there would be no need for her ministrations this morning.

Although Giuliana herself has been on the road for less than a year, bus hostesses have been familiar to travelers on Italy's long distance motorcoaches since 1945. After the war, CIAT (the Italian Tourist Automobile Company) set out to attract some of the reviving tourist trade with a fleet of luxurious sightseeing busses, each fitted with such comforts as wideview windows, radio, and a night light and shelf at each seat. Two drivers, who spell each other every hour, were assigned to each bus to avoid the hazard of driver fatigue on a long trip. And as an aid to the visitor from abroad, a hostess to act as guide and interpreter was added to the staff. This was an innovation so warmly received that it began to be copied in other countries.

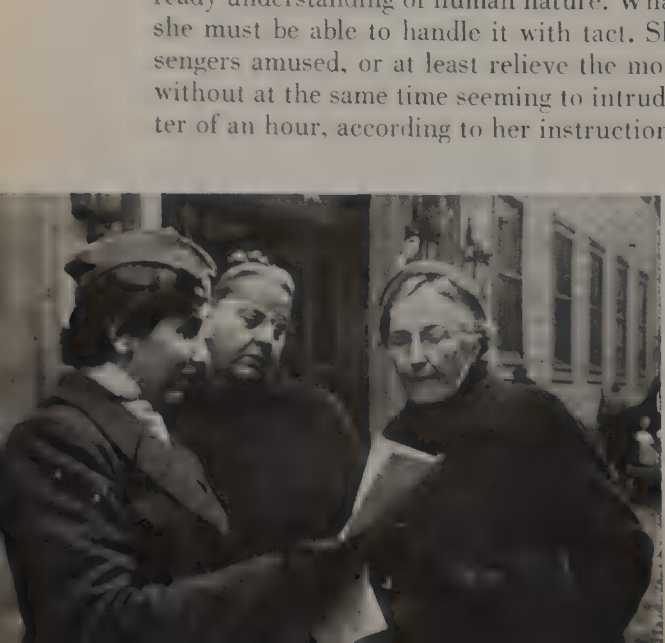
Like the more familiar airline hostess, these girls must be young and personable. But the Italian bus hostess must also be able to converse fluently in three languages besides her own—English, French and German. She must be well grounded in the history of her country and know something about its artistic treasures. During her six weeks' training, she is briefed in her duties as hostess and given a refresher course in the history, points of interest and legends of the part of the country through which she will travel.

As might be expected among such a group, there is considerable turnover. Of the thirty hostesses now in CIAT's employ only three are veterans of five years of service. There is always a waiting list, however, for these jobs are much sought after.

GIULIANA CAMPIONI entered this service soon after she left high school because she wanted to travel, because she enjoyed working with people and because she had to earn her living. The job of bus hostess has offered a pleasant but by no means easy way of achieving all three objectives.

Except for a weekly day off, she works from eight to ten hours a day, sleeping alternate nights at her family's apartment in Rome and wherever her duties take her: Florence, Genoa, Venice, Milan or Naples.

Not only are the hours long, but the work itself is exacting. In addition to her other qualifications, a hostess must have a ready understanding of human nature. Whatever situation arises, she must be able to handle it with tact. She must keep the passengers amused, or at least relieve the monotony of a long ride, without at the same time seeming to intrude. At least every quarter of an hour, according to her instructions, she must say some-



THE HOSTESS describes their route to some of her passengers. She knows the legends of each of the places they will pass as well as the history

AT ASSISI (above) passengers return to the bus after a foot tour, with the hostess as guide, to some of the town's churches and museums

PERUGIA (below) was a republic in the eleventh century. It is famous for its Etruscan ruins, medieval buildings and for the sweets it makes

DRIVER unloads baggage at Florence where an overnight stop will be made. Passengers are delivered to hotels and picked up in morning

thing of interest about the place they are going through or which they are about to reach.

THIS is a phase of the work that holds some surprises. During the first few months on the job, Giuliana never failed, when passing through a section of the country near the Lake of Bolsena, to point out an ancient tower and explain that in it a certain Theodatus had shut up and strangled his cousin Amalasunta. Generally, the passengers took no more than a passing interest in this bit of medieval history. But one day a South American asked her: "This man Theodatus, was he a Nazi or a Fascist?" Since then, Giuliana has been content to point to the tower and say simply that it dates back to barbaric times.

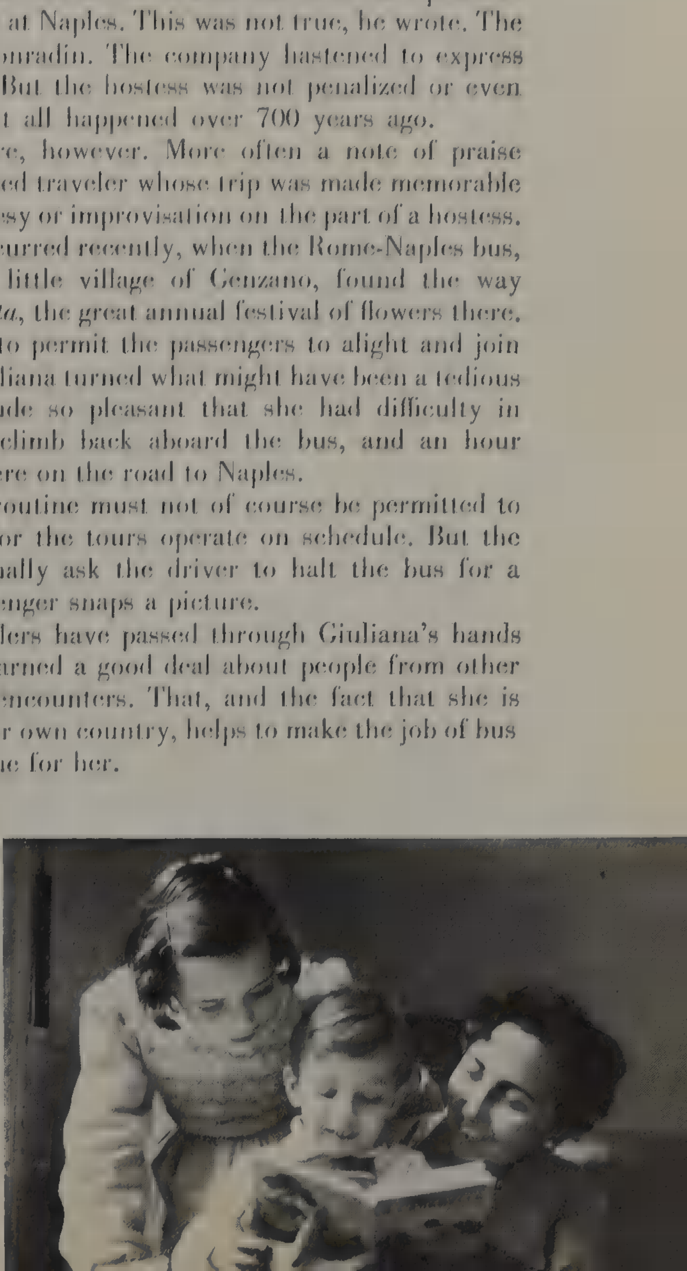
It is a lesson she has not forgotten. It taught her that not all her friends for a day can be expected to know Italian history as well as they know their own. So when the coach stops for a brief tour of a town she now relates only the most important facts about it or the most curious legends.

A few months ago a complaint came to CIAT headquarters about one of the hostesses. A Danish tourist protested that she had informed him that Conrad of Swabia had been held prisoner in the Castel dell'Ovo at Naples. This was not true, he wrote. The prisoner had been Conradin. The company hastened to express regret over the slip. But the hostess was not penalized or even reproved—after all, it all happened over 700 years ago.

Complaints are rare, however. More often a note of praise comes in from a pleased traveler whose trip was made memorable by some special courtesy or improvisation on the part of a hostess. One such incident occurred recently, when the Rome-Naples bus, passing through the little village of Genzano, found the way blocked by the *infiorata*, the great annual festival of flowers there. By stopping the bus to permit the passengers to alight and join in the celebration Giuliana turned what might have been a tedious delay into an interlude so pleasant that she had difficulty in persuading them to climb back aboard the bus, and an hour passed before they were on the road to Naples.

Such breaks with routine must not of course be permitted to establish a pattern, for the tours operate on schedule. But the hostess may occasionally ask the driver to halt the bus for a moment while a passenger snaps a picture.

Nearly 3,000 travelers have passed through Giuliana's hands so far and she has learned a good deal about people from other lands in these brief encounters. That, and the fact that she is seeing the sights in her own country, helps to make the job of bus hostess an exciting one for her.



AT HOME, after a long day, Giuliana reads to her little brother and to one of her three sisters. She spends alternate nights with her family

FARM HANDS are being freed by machines from back-breaking tasks like picking cotton. Since mechanized agriculture needs fewer men, many workers are migrating to industrial centers

COTTON GOES MECHANICAL

The stooped back, the plodding mule give way to new farm machines that run on oil

COTTON—a fiber used by mankind for at least five thousand years and the farm commodity most important to the American economy—is yielding at last to the mechanical age. Belatedly, machines are taking over the arduous chores of "stoop" labor, which traditionally has tilled the cotton fields.

Cotton, ironically, was an element in the industrial revolution of two centuries ago; the first steam-driven machine was a cotton spinning frame. Cotton was also the first crop extensively treated with insecticides by airplanes. Yet farming of cotton has resisted full mechanization until lately, while other major crops went the way of the machine much earlier.

Even today, the 100 per cent mechanized cotton farm is a rarity, existing only here and there as a model for growers. But the trend is now clear. The tractor, Diesel- or gasoline-powered, is the work horse of the mechanized farm. In 1920, there were four tractors for each thousand farm workers in the South; in 1945, sixty-one tractors for each thousand workers; in 1951, eighty-five tractors.

AS the machine replaces the human back in the cotton field, there are certain parallel developments of importance not only to the South but to the industrial North as well.

First, cotton growing is shifting westward. More and more land in West Texas, Arizona and California is being planted to cotton. This land is largely irrigated, a fact that itself is a boon to growers. For cotton needs a good deal of water while growing, a good deal of dryness just before and during harvest. Irrigation provides a controlled water supply. The flat lands of the Southwest (provided there is water for irrigation) have therefore become a focal point of new cotton plantations.

Second, much of the Old South's unskilled labor is migrating gradually to the North or to expanding southern industrial centers, in search of urban jobs. Mechanized agriculture needs fewer men. A great many farm workers who used to live by the hoe thus must find their futures elsewhere (although, of course, many southern farmhands are learning to run and maintain the new machinery).

Third, cattle ranching is moving eastward from the plains of the Southwest. Ranchers of West Texas are converting cotton lands in Mississippi, Alabama, Louisiana and Florida into ranches. The heavy rainfall of the Southeast makes for cheap and abundant grass; and grass makes cattle.

These changes are slow and subtle. The five-acres-and-a-mule cotton grower on the side of a southern slope is not yet obsolete. But he finds it harder and harder to compete against a tractor-equipped neighbor. It takes something like a hundred acres of cotton to make full mechanization economical; a smaller tract cannot keep the machines busy enough to pay for their cost and upkeep. So the little farms tend to be absorbed into the larger ones.

Thus the great southern cotton plantations, which were broken up after the Civil War, are slowly being reassembled under a new pattern of ownership, and turning to machines to do their work. Thus, too, the Old South assures itself that it will not depose King Cotton even though cattle and industry are broadening the base of its economy.

In this era of rising prices, mechanization is helping to keep the cost of growing cotton within reason. Farmers figure that hoe labor in cotton costs $15 to $20 an acre in the Mississippi delta; the same job, by the newer methods, may be done for about $10 or even less. One family can grow ten or twelve acres of cotton by mule and manpower; but one tractor operator can cultivate a hundred acres, with a little help from his family at the peak of the weeding season. Or, from another view, it takes about 160 man-hours of labor to grow and harvest a bale (500 pounds) of cotton when using hand labor and mules; on a partly mechanized farm which still does some weeding by hand, a bale requires only thirty man-hours, of which twenty are of hand hoeing.

THUS machines are helping to maintain a supply of cotton at a time when labor shortage and labor costs might have left millions of acres idle. In terms of defense as well as normal needs, this continuity of supply is essential. For the United States, in spite of the growing use of synthetics, still depends on cotton for 67 per cent of its fiber needs. (The biggest single user, oddly, is the automobile industry—for seat covers, upholstery, tires and convertible tops.) The nation also de-

A WEST TEXAS FIELD is "listed" to prepare it for cotton planting. Machines have made it economical to turn large areas of irrigated land in the Southwest into cotton plantations pends on cotton seed for almost half its edible vegetable oils.

Mechanization of cotton growing has been slow because, until very lately, there has been no alternative to hand weeding. Cotton growers had to maintain a labor supply for the few weeks of hoeing. There wasn't much inducement to buy machines, especially cotton pickers, for the rest of the work so long as field labor had to be supported around the calendar anyway. But the drift of manpower into factories and the military, particularly since the Korean emergency, has speeded the development of machines with attachments for applying weed-killing sprays to do the last of the hand chores in the cotton field.

Consider the variety of mechanical operations which are performed on a fully mechanized cotton plantation:

Tractor-drawn plows first dig into the earth. Then harrows, likewise powered by tractors, pulverize and smooth the topsoil for planting, and tractor-powered plows turn fertilizer into the ground. Planting, too, may be done by machine.

Next comes the first of the new techniques to eliminate hand labor—pre-emergence spraying with herbicides. The theory of pre-emergence spraying is that weed killers (in water or oil bases) can be sprayed cheaply on the soil during or just after the planting operation. They last long enough to control weeds before the plants sprout and until the seedlings are several inches high.

ONE of the most tedious tasks in cotton growing used to be the process known as chopping. Cotton seed was planted thickly in long rows, to make sure that enough plants came up to make a crop. It was necessary, then, to thin the plants by methodically removing the surplus seedlings. Teams of workers used to move snail-like down a field, chopping out the extras by hoe.

Today farmers have two means of doing the same job mechanically. Some simply plow at a right angle across the rows of cotton, thereby removing many of the new plants. Others use thinning machines, attached to tractors, which chop out surplus plants according to a pre-set pattern. Another innovation, which eliminates thinning altogether, is the mechanical cotton planter. It sows the seed in correctly spaced clusters, called "stands" or "hills."

When the cotton is seven to ten days old, and at least three inches high, the farmer can begin to apply the new techniques of post-emergence treatment for control of weeds.

Oil sprays for weed control, such as Flit 38 Weed Killer, are applied by the directional spray technique. An ingenious arrangement of nozzles, covering up to four rows, attached to the cultivating tractor, confines the spray to the ground and to the cotton stems—the plants would be killed if it reached the foliage.

Insecticides, on the other hand, are sprayed over the entire crop to guard against the insects to which cotton is so susceptible, particularly the boll weevil and the pink boll worm.

As the stalks of the plants become larger and stronger, modern growers turn to miniature flame throwers for the final stages of weed control. These jets, attached to arms that span up to four rows of plants, burn liquefied petroleum gases to sear weeds and grasses competing with the cotton plants. Flaming controls all but the toughest weeds, and those too if they have not been allowed to grow too large. Flaming is a delicate job, requiring deft operation to avoid damage to the crop.

As the cotton plants mature (two to six feet high in the United States) they create enough shade to kill most weeds close by. But that is precisely the time when insects can do most damage to maturing bolls. The airplane, spraying or dusting insecticides across fields, is the best means, over great areas, of curbing pest damage just before harvest.

THE harvest itself is performed by monster self-powered machines which follow down the rows of plants, snatching the fleecy fiber from the open bolls and blowing it into hoppers.

But before mechanical harvesters can do their job efficiently, the plants must shed their leaves. Planters on the high plains of Texas, where early frosts are predictable, can depend on winter's first touch to defoliate their cotton for harvesting. Elsewhere, growers use chemical defoliants, often sprayed or dusted by airplane, which wither leaves and cause them to drop without harming the bolls.

Few commercial growers have gone all the way toward such mechanization, although the biggest plantations get closer to that goal every year. But experimenters at Mississippi State College, in 1950 and 1951, showed that hand cultivation might be entirely eliminated; they raised two crops, in those years, with no reliance on the hoe except in seed-bed preparation.

As an indication of how machinery on the cotton plantation pays off, an economist of the United States Department of Agriculture at the Delta Branch Experiment Station in Stoneville, Mississippi, has worked out cost estimates for two theoretical 750-acre farms in the Mississippi delta. One is fully mechanized and the other is not. Omitting charges for land and management, he arrived at these figures:

SPRAYING a weed killer (left) on the soil just after planting controls weeds until seedlings are several inches high. A mechanical planter (center) seeds four rows at once. Right, a specially equipped tractor applies a chemical fertilizer to young plants as it cultivates them

AT HARVEST TIME machines move down the rows of cotton, methodically plucking the fleecy fiber from the bolls and blowing it into cage-like hoppers behind drivers

The nonmechanized 750-acre farm must support thirty sharecropper families, plus a straw boss, a blacksmith and a hostler. The mechanized farm needs only six tractor drivers, a straw boss and a shop man.

It costs the theoretical 750-acre nonmechanized farm 27.9 cents a pound to produce cotton. The mechanized farm produces it for 13.5 cents a pound, including the costs incurred in an equipment investment eight times as great as on the other farm.

The nonmechanized 750-acre farm nets $12,246 for its year's work; the mechanized plantation three times as much.

It looks as though the faithful old mule is waging a losing battle.

THE LOW-FLYING PLANE, spraying or dusting insecticides across the fields, is the best means of protecting great areas of cotton from pest damage just before the harvest

UNDERWATER TANKER

A STRANGE ship is plowing the blue waters of the Pacific. It looks like a submarine. As it disappears and appears in great swirls of foam, it behaves like one. But it is probably the fattest and least lethal submarine ever built.

The crew of this craft call her the "Pregnant Porpoise." Her official name, however, is the SSC-362 or USS *Guavina* and she is a submarine tanker, the forerunner of what the Navy's Undersea Warfare Division regards as one of the potentially most useful arms of the "silent service."

Already, according to Rear Admiral Frank Akers, Assistant Chief of Naval Operations for Undersea Warfare, refueling operations between the *Guavina* and other submarines have been accomplished.

Just how these operations have been carried out has not been revealed. But Lt. Commander R. L. Workman, skipper of the *Guavina*, says, "Right now both submarines must surface, at least briefly, to connect fueling lines."

This would indicate that after the fuel lines have been hooked up, the two vessels could submerge to "snorkel" depth and there continue fueling. (A "snorkel" is a Dutch-invented, German-developed device which, extending above the surface, enables a submarine's Diesel engines to "breathe" and operate while the sub is submerged.)

Whether the submarines rest at almost a standstill under the water or, tied together, continue to move during refueling operations is still classified information. In either case, veteran submariners agree, superb seamanship is required of the skippers of both vessels. They also agree that development of undersea oilers will be of great value in future undersea operations.

During World War II, the Germans used submarine tankers on a small but successful scale to supply their "wolfpack" fleets operating off the east coast of the United States, off Brazil and in the Caribbean. Their "milch cows," as the Germans called them, enabled the Nazis to keep their fleet-type subs in position astride the vital shipping lanes for months at a time, instead of just weeks.

More recently, the USS *Pickerel* made a record-breaking undersea cruise of 5,200 miles from Hong Kong to Pearl Harbor in twenty-one days. Had the techniques of submarine refueling been perfected at the time, the *Pickerel* could have remained submerged for months and traveled round the world instead of just half way across the Pacific.

Because today's combat submarines must spend about half their operational life going back and forth from station to base for fuel and supplies, submarine tankers could increase the operational strength of our present active fleet of subs by almost 50 per cent. They could service them on the spot, thousands of miles from their home bases, and thus permit a relatively few combat submarines to do the work of many.

Such refueling service, for example, would be particularly valuable to our picket submarines which stand submerged guard off enemy harbors, spotting and reporting the movements of planes, convoys, warships, and even other submarines, to our own fleet and air arms.

IN addition to their primary job of refueling other submarines at sea—and even blimps and seaplanes—the undersea oilers also could provide combat subs with torpedoes, food and other supplies and mail at frequent intervals; the *Guavina* has space for dry cargo and special dry cargo handling gear.

Submarine experts even foresee ways of supplying beleaguered land forces with fuel from submerged tankers which need never surface to carry out the operation.

One way to do this is called the buoy system. The submarine tanker remains submerged a short distance off shore and shoots a buoy to the surface. It carries with it a fuel line from the tanker below. Inside a compartment of the buoy is a telephone. A two- or three-man crew comes out from the shore in a small boat at night, locates the buoy and attaches shore connected hose lines to the buoy's fittings. The men might even pour fuel from the hidden sub into barrels or drums in their own small craft.

The *Guavina*, now considered fully operational by the Navy after passing her trial tests, is currently on duty in the Pacific. Many of her duties there, of course, are secret but there are certain facts about this unique oiler which can be revealed—some of them for the first time.

THE USS *Guavina*, a regular, fleet-type submarine, was built in 1943 at a cost of more than $10 million. Her World War II job included six successful combat patrols.

In the winter of 1945 the *Guavina*, with her score of Japanese ships neatly stenciled on her control room bulkhead, slipped into Mare Island, California, to be "mothballed." She rested there until shortly before the start of the Korean War when she was selected for conversion into the Navy's first undersea oiler. The conversion cost some $2 million and when she emerged even the men who had served on her would not have recognized her.

On either side of her long pressure hull had been hung large "saddle" tanks which give her a much broader beam than conventional submarines have. These tanks, together with smaller ones inside, make it possible for the *Guavina* to haul large quantities of Diesel fuel, aviation gasoline or fuel for jet planes. The capacity of the tanks is secret but, according to one Navy officer, "In the book it says her job is to refuel submarines, plural."

Because of her interior oil cargo tanks and the space allotted to dry cargoes, life aboard the *Guavina* is even more cramped than it is on the usual fleet-type subs. Yet morale among the crew has stayed high.

Perhaps it is due to the cook who, in his tiny cubicle, has managed to produce a steady stream of delicious meals, topped off with the traditional fresh-baked pies and cakes. Another factor possibly contributing to good morale might be that, because of their buoyancy, the *Guavina's* saddle tanks make her a steadier, better riding vessel. As one of her crew cracked, "She's too fat to roll!"

Regardless of the comments her shape may draw, the Navy is greatly encouraged by the *Guavina's* behavior during all her runs. And when her job as a prototype is finished, the information gained will be used in the construction of a number of undersea oilers—from the keel up.

OIL TANKS of the U. S. Navy's first underwater tanker are clearly visible against the churned up water of San Francisco Bay. They hang "saddle" fashion on either side of the submarine's long pressure hull ▶

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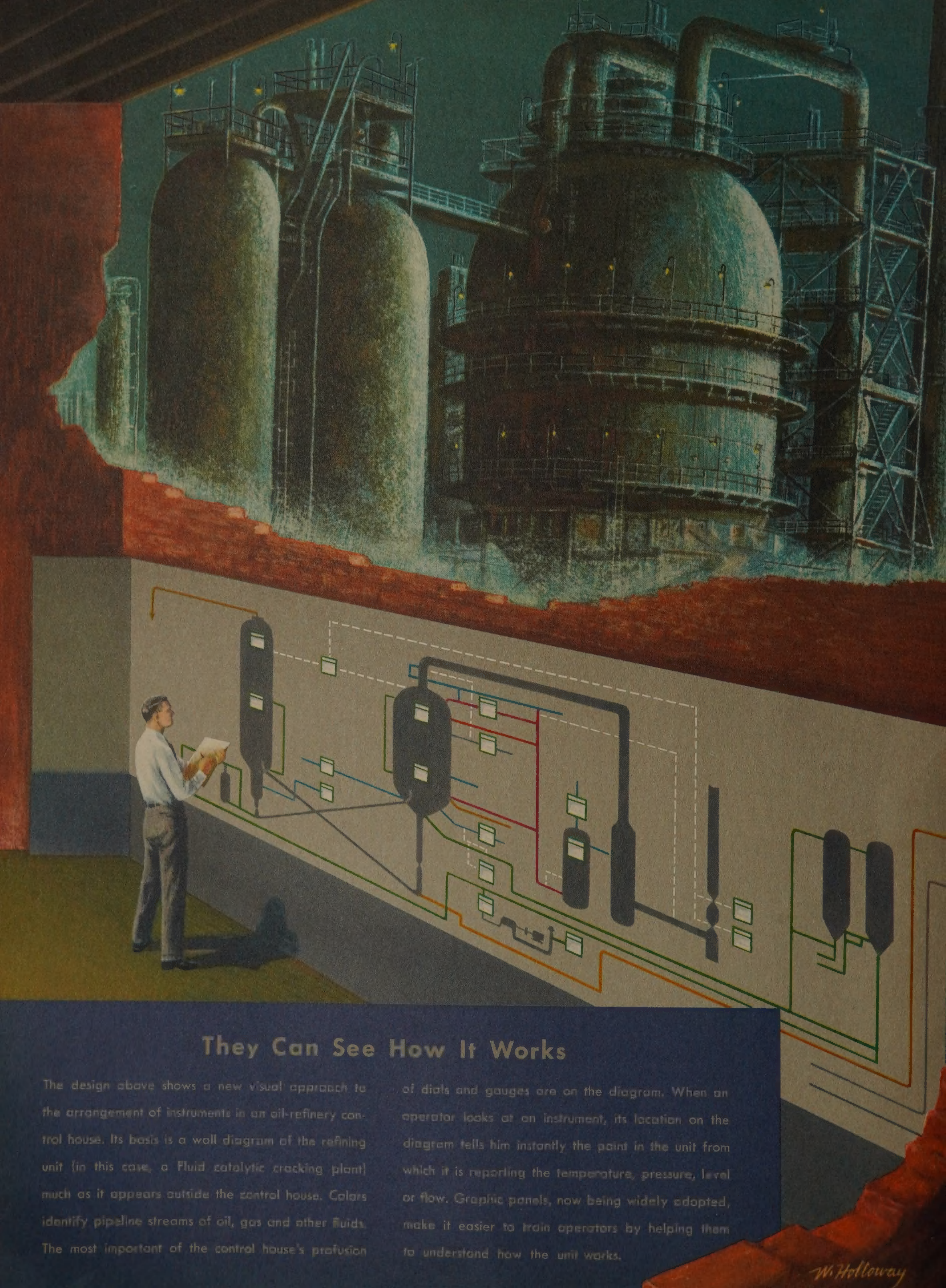

They Can See How It Works

The design above shows a new visual approach to the arrangement of instruments in an oil-refinery control house. Its basis is a wall diagram of the refining unit (in this case, a Fluid catalytic cracking plant) much as it appears outside the control house. Colors identify pipeline streams of oil, gas and other fluids. The most important of the control house's profusion of dials and gauges are on the diagram. When an operator looks at an instrument, its location on the diagram tells him instantly the point in the unit from which it is reporting the temperature, pressure, level or flow. Graphic panels, now being widely adopted, make it easier to train operators by helping them to understand how the unit works.